REMARKS

Claims 1-22 are pending in the present application. In the Office Action mailed January 3, 2006, the Examiner rejected claims 1-7, 9-12, 14-20 and 22 under 35 U.S.C. §102(e) as being anticipated by Machida (US Pub. 2002/0115929). The Examiner next rejected claims 8, 13 and 21 under 35 U.S.C. §103(a) as being unpatentable over Machida in view of Maier et al. (US Pub. 2001/0045830).

Machida discloses "a magnetic resonance imaging system capable of imaging a plurality of selective regions, such as multi-slice regions, while an object to be imaged is continuously moved in a certain direction." ¶2. In this regard, Machida discloses an MR system having a tabletop that "is driven to continuously move at a given speed in the longitudinal direction (i.e., Z-axis direction)" so that "a region to be imaged of an object (for example, the abdomen of a patient) is gradually, but continuously inserted into the imaging space of the magnet." ¶55. Particularly, Machida teaches multi-slice acquisition from a continuously moving object. To this end, as a head or leading slice exits the imaging region of the MR system, a new slice moves into the imaging region at "an entrance-sided first position within the imaging range." ¶61. "In other words, every time the alternately changed head slice reaches the exit-sided border of the imaging range D, a new slice is added to an initial position located inside the entrance-side border of the imaging range D for data acquisition." ¶62.

Machida further discloses that its continuous moving table, multi-slice imaging technique is applicable with "a variety of preparation pulses." ¶103. The reference discloses that "the pre-saturation pulse is required that it be applied to a position considerably close to a current scanned slice." ¶103. In this regard, "an applied position of the pre-saturation pulse is changed in compliance with a moved distance of an object." ¶103.

The technique disclosed by Machida differs from the claimed invention on at least a couple of fronts. For example, the present invention, as defined by claim 1, calls for applying a preparation pulse to prepare a region of interest outside a fixed imaging slice, but within an optimal imaging volume. Machida, however, teaches a fixed imaging range that "is determined based on the size of the uniform region in the static magnetic field." ¶57. This uniform region is widely known in the art as corresponding to the optimal imaging volume of the scanner. In this regard, Machida discloses that a pre-saturation pulse is applied to slices before those slices are in the uniform region. Therefore, the technique does not apply a preparation pulse that is within the optimal imaging volume of an MR scanner, as called for in claim 1.

Additionally, the technique of Machida suffers from a drawback overcome by the invention called for in claim 1. Specifically, in the technique disclosed by Machida, multiple slices are imaged per saturation pulse. As a result, the contrast will be different across the multiple slices. Images reconstructed according to the invention of claim 1 have more consistent contrast from slice to slice because each slice is prepped individually.

Therefore, it is believed that claim 1 is directed to subject matter patentably distinct from that taught and/or suggested by Machida.

Claim 10 calls for, in part, a computer programmed to "receive a user input identifying a preparation interval" and to "determine a frequency offset value" from the preparation interval. The preparation interval, TI, is generally understood by one skilled in the art as the time period between application of a prepatory saturation pulse and the commencement of the imaging segment of a pulse sequence. Therefore, the computer called for in claim 10 is programmed to determine an offset frequency for a preparation RF pulse based on the recovery time, TI.

In contrast, Machida discloses an offset frequency that is defined by the gyromagnetic ratio, magnitude of strength of a slice-directional gradient pulse, speed at which the patient table is moved, and TR. See ¶8. None of these parameters for determining the offset frequency value corresponds to TI. Moreover, one skilled in the art will readily appreciate that the offset frequency disclosed by Machida is for slice tracking. That is, by offsetting the frequency of the RF saturation pulse "enables the position of a selectively excited slice to track a desired particular section in a continuous manner during movement of the object." ¶9. In this regard, Machida discloses a technique that determines an offset frequency necessary for slice tracking and does so without consideration of the recovery time of spins subjected to a prepatory saturation pulse.

Accordingly, it is believed that claim 10 is patentably distinct from that disclosed and/or suggested by Machida.

Claim 17 also stands rejected as being anticipated by Machida. Responsive thereto, Applicant refers the Examiner to the remarks made above with respect to claim 10. As set forth above, Machida fails to teach or suggest a computer programmed to determine a distance spins of magnetization prepared tissue will travel while the patient is being moved through an imaging volume during a prescribed preparation interval that is defined as the time between application of a saturation pulse and commencement of an imaging pulse sequence. The system disclosed by Machida sets a fixed imaging volume and translates multiple slices through that imaging volume continuously. Machida discloses that an offset frequency is used to track the multiple slices from the entrance to the exit of that fixed imaging volume. Machida further discloses that the table is

translated at a constant speed and that speed is defined as: V=D/TS where D is the width of an imaging range and TS is the time necessary to acquire data from each slice. Thus, the recovery time of spins that have been subject to pre-saturation is not a determining factor in the technique of Machida.

Therefore, it is believed that claim 17 is patentably distinct from that taught by the art of record.

Regarding the rejection of claims 8, 13, and 21, Applicant respectfully disagrees with the examiner with respect to the art as applied, but in light of claims 8, 13, and 21 depending from what are believed otherwise allowable claims, Applicant does not believe additional remarks are necessary and requests allowance of claims 8, 13, and 21 based on the chain of dependency.

Therefore, in light of at least the foregoing, Applicant respectfully believes that the present application is in condition for allowance. As a result, Applicant respectfully requests timely issuance of a Notice of Allowance for claims 1-22.

Applicant appreciates the Examiner's consideration of these Amendments and Remarks and cordially invites the Examiner to call the undersigned, should the Examiner consider any matters unresolved.

Respectfully submitted,

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